[](http://www.google.com.au/imgres?imgurl=http://images.clipartof.com/small/5605-Happy-Man-Wearing-A-Safety-Helmet-While-Riding-A-Bicycle-Clipart-Illustration.jpg&imgrefurl=http://www.clipartof.com/details/clipart/5605.html&usg=__IcxPmOJcIMb2_q61Isame4xNtVg=&h=450&w=431&sz=63&hl=en&start=26&um=1&itbs=1&tbnid=JD1RwgrORnY4RM:&tbnh=127&tbnw=122&prev=/images?q=bicycle+clip+art+free&start=18&um=1&hl=en&sa=N&rlz=1T4GGLL_enAU353AU354&ndsp=18&tbs=isch:1) [](http://www.google.com.au/imgres?imgurl=http://www.wackystock.com/thumbnail/6203-woman-wearing-a-helmet-and-riding-a-bicycle-clipart-picture-by-dennis-cox-at-wackystock.jpg&imgrefurl=http://www.wackystock.com/tag/bicycles-clipart&usg=__tXKISR0r_ENTXow0KjHj7uth30U=&h=170&w=170&sz=15&hl=en&start=210&um=1&itbs=1&tbnid=JKN0KhpTa84gFM:&tbnh=99&tbnw=99&prev=/images?q=bicycle+clip+art+free&start=198&um=1&hl=en&sa=N&rlz=1T4GGLL_enAU353AU354&ndsp=18&tbs=isch:1)

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The circumference of a circle is where r is the radius or d is the diameter of the circle – in this exercise a wheel.

Some practice calculations:

1. calculate the circumference of a wheel with radius 30 cm. Ans:\_\_\_\_\_\_\_
2. calculate the circumference of a wheel with radius 30 cm. Ans:\_\_\_\_\_\_\_
3. calculate the circumference of a wheel with diameter 182 cm. What sort of vehicle might have a wheel this size? Ans:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Measure the radius, diameter and circumference of the front wheel of a bike.

a. Radius \_\_\_\_\_\_ b. Diameter \_\_\_\_\_\_\_\_\_\_\_ c. Circumference:\_\_\_\_\_\_\_\_\_\_\_\_

3. When a bicycle wheel moves so that the wheels rotate one full cycle, the bicycle moves forward **one circumference.**

[](http://www.google.com.au/imgres?imgurl=http://www.clker.com/cliparts/9/5/d/6/1228423021958944491schoolfreeware_Bike.svg.hi.png&imgrefurl=http://www.clker.com/clipart-25229.html&h=368&w=600&sz=30&tbnid=dzpVlJY2SE791M:&tbnh=83&tbnw=135&prev=/images?q=bicycle+clip+art+free&usg=__khfHZs8JNBn9zwSdUYMMb-PYaaY=&sa=X&ei=3e9pTJn5N4L8vQOYnfD9Aw&ved=0CCsQ9QEwBg)[](http://www.google.com.au/imgres?imgurl=http://www.clker.com/cliparts/9/5/d/6/1228423021958944491schoolfreeware_Bike.svg.hi.png&imgrefurl=http://www.clker.com/clipart-25229.html&h=368&w=600&sz=30&tbnid=dzpVlJY2SE791M:&tbnh=83&tbnw=135&prev=/images?q=bicycle+clip+art+free&usg=__khfHZs8JNBn9zwSdUYMMb-PYaaY=&sa=X&ei=3e9pTJn5N4L8vQOYnfD9Aw&ved=0CCsQ9QEwBg)

One circumference

You can test this by placing a mark at the base of one wheel while your bike is stationary, then move forward until the mark is in the same place after one revolution of the wheel.

Measure the distance moved and compare with your calculation.

My measured circumference: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. If your bicycle has a wheel diameter of 60 cm,

a. how far will the seat move forward with one full turn of the wheel?

b. how far will the bike travel with

i. 20 turns of the wheel? \_\_\_\_\_\_\_\_\_\_\_

ii. 120 turns? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. How many times does the whee turn if the bike is moved forward

i. 200 cm? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ii. 950 metres? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

iii. 100 kilometres? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**5. Speed**:

When you know the diameter of your wheel you can calculate your **speed**.

Some bikes have gears which help the wheels to turn more than the pedals turn.

**eg**: in bottom gear on Lucy’s bike, the wheels turn twice for every one full turn of the pedals . ***A ratio describes this as 1:2. ie for 1 pedal turn, the wheel turns twic***e.

Suppose Lucy’s wheels are 60 cm in diameter and she can pedal at 100 turns per minute.

* Each time the wheel turns once, the bike moves forward  x 60 cm = 1.88 m
* If Lucy pedals 100 times per minute, the wheel moves 200 x 1.88m (using gear ratio 1:2) which = 376 m.
* So every minute the bike moves 376 m.
* In one hour or 60 minutes, the bike travels 376 x 60 = 22608 m = 22.6 km.
* So (average) speed is 22.6 km per hour.

1. How far would Lucy travel if she pedals at 100 times per minute but uses the gear ratio 1 : 3 ?
2. In top gear (1 : 4) what would her speed be if she pedals 90 times per minute?

[](http://www.google.com.au/imgres?imgurl=http://www.clipartpal.com/_thumbs/athlete_bicycles_201781_tnb.png&imgrefurl=http://www.clipartpal.com/clipart/sport/biking_201781.html&usg=__BmpxJQ2Pf5rJwKNSv6QPo5-SmrA=&h=350&w=269&sz=59&hl=en&start=8&um=1&itbs=1&tbnid=MfwQ94JQ-U9bFM:&tbnh=120&tbnw=92&prev=/images?q=bicycle+clip+art+free&um=1&hl=en&sa=X&rlz=1T4GGLL_enAU353AU354&tbs=isch:1)6. Find out about your own bike if it has gears (or work with a friend). Measure the wheel diameter and the gear ratios (consult the bike manufacturer if you do not know this). Use this data to make a table of speeds for your bike.

7. What happens when the wheels have different diameters?

[](http://www.google.com.au/imgres?imgurl=http://www.illustrationsof.com/royalty-free-rf-bicycle-clipart-illustration-by-spanky-art-stock-sample-10802.jpg&imgrefurl=http://www.illustrationsof.com/10802-royalty-free-bicycle-clipart-illustration&usg=__5HNYwbC8SmYBTcuCFERAba7aITE=&h=1024&w=1024&sz=555&hl=en&start=130&um=1&itbs=1&tbnid=UZp7fDG2IOE6sM:&tbnh=150&tbnw=150&prev=/images?q=bicycle+clip+art+free&start=126&um=1&hl=en&sa=N&rlz=1T4GGLL_enAU353AU354&ndsp=18&tbs=isch:1)

Have fun!